UNITED STATES PATENT AND TRADEMARK OFFICE

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Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Application Number: 10/817,300
Filing Date: April 02, 2004
Appellant(s): ERHARDT ET AL.

MAILED

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GROUP 2800

Mikio Ishimaru
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed February 27, 2006.

(1)   Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2)   Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly

affect or be directly affected by or have a bearing on the decision in the pending appeal

is contained in the brief.

(3)   Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4)   Status of the Amendments After Final

No amendment after final has been filed.

(5)   Summary of Invention

The summary of invention contained in the brief is correct.

(6)   Issues

The appellant's statement of the issues in the brief is correct.

(7)   Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8)   Prior Art of Record

US 5,982,920	Tobin et al.	November 9, 1999
US 6,397,166	Leung et al.	May 28, 2002
USPG PUB 2002/0145430 A1	Arai et al.	October 10, 2002

(9)   Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

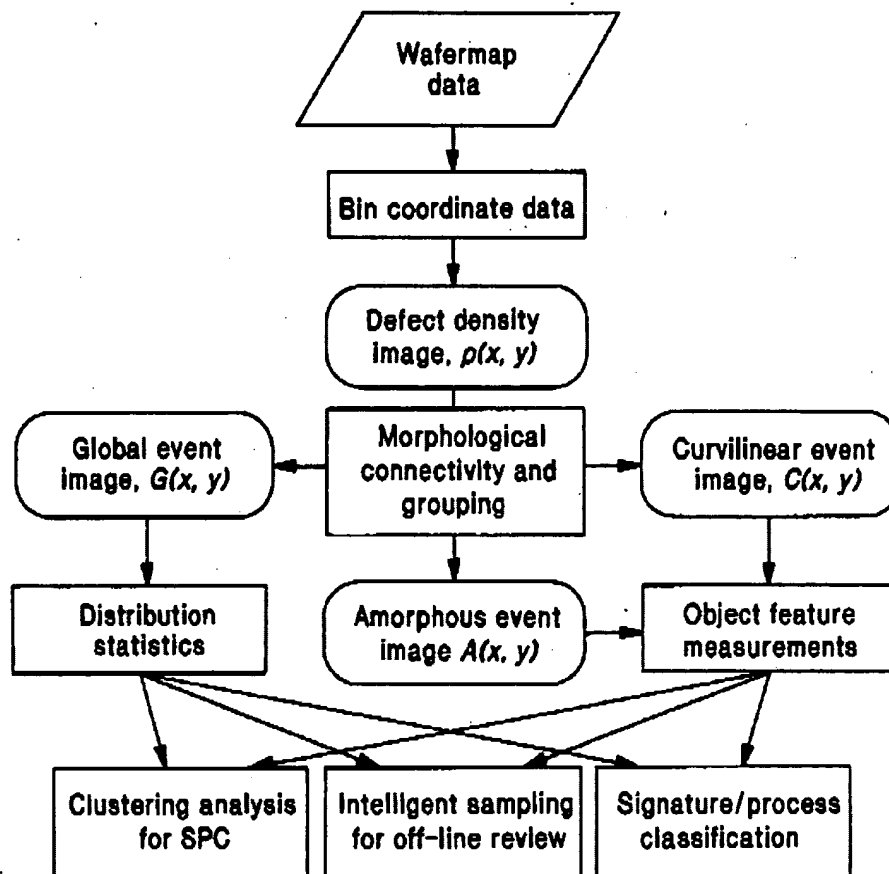form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 6-7, 11-12, 16-17, are rejected under 35 U.S.C. 102(b) as being

anticipated by Tobin, Jr. et al (5,982,920).

Regarding claim 1, 6, 11, 16 Tobin teaches a method for analyzing a

semiconductor device comprising: testing a semiconductor device to produce first data

and second data (Abstract, Column 2, Lines 40-48) and applying a clustering method to

the first data to create a clustered first data (Column 2, Lines 40-48); and correlating the

clustered first data with the second data to determine analyzed data (Column 2, Lines

40-48).

Regarding claim 2, 7, 12, 17 Tobin teaches a method wherein the clustering

method is spatial signature analysis (Figure 2, Column 2, Lines 23-25).

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                          ┌─────────────┐
                         ╱   Wafermap    ╱
                        ╱     data      ╱
                       └─────────────┘
                              │
                              ▼
                    ┌───────────────────┐
                    │ Bin coordinate data│
                    └───────────────────┘
                              │
                              ▼
                    ╭───────────────────╮
                    │  Defect density   │
                    │  image, p(x, y)   │
                    ╰───────────────────╯
                              │
       ┌──────────────┐  ┌───────────────┐  ┌──────────────┐
       │ Global event │◄─│ Morphological │─►│Curvilinear event│
       │ image, G(x, y)│  │connectivity and│  │ image, C(x, y) │
       │              │  │   grouping    │  │              │
       └──────────────┘  └───────────────┘  └──────────────┘
              │                  │                   │
              ▼                  ▼                   ▼
       ┌──────────────┐  ┌───────────────┐  ┌──────────────┐
       │ Distribution │  │Amorphous event│─►│Object feature│
       │  statistics  │  │ image A(x, y) │  │ measurements │
       └──────────────┘  └───────────────┘  └──────────────┘
              │    ╲            ╱   ╲         ╱    │
              ▼     ╲          ╱     ╲       ╱     ▼
    ┌──────────────────┐ ┌──────────────────┐ ┌──────────────────┐
    │Clustering analysis│ │Intelligent sampling│ │Signature/process │
    │     for SPC      │ │ for off-line review│ │  classification  │
    └──────────────────┘ └──────────────────┘ └──────────────────┘
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Regarding claim 5, 10, 15, 20 Tobin teaches a method wherein the analyzed

data is selected from a group consisting of wafer mapping (Page 3, Lines 50-58),

commonality, or correlation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 8, 13, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobin (5,982,920) as in view of Leung et al. (6,397,166).

Regarding claim 3, 8, 13, 18 Tobin discusses all the limitations as mentioned above. However, Tobin does not teach a method wherein the clustering method is K-means clustering.

Leung teaches a method wherein the clustering method is K-means clustering (Column 6, Lines 53-58).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a method wherein the clustering method is K-means clustering as taught by Leung into Tobin for the purpose of further optimizing partitions within a data set (Leung, Background of the Invention, Column 1, Lines 58-67).

Claim 4, 9, 14, 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tobin (5,982,920) in view of Arai et al (US 2002/0145430 A1).

Regarding, claim 4, 9, 14, 19 Tobin teaches all the limitations discussed above however, Tobin does not teach a method wherein the first data is selected from a group consisting of IV curves and Vt distributions. Arai et al discloses a method wherein the first data is selected from a group consisting of IV curves and Vt distributions ("IV curves", Fig.3 & 4, Page 8, Paragraph 115).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a method wherein the first data is selected from a group consisting of IV curves and Vt distributions as taught by Aria into Tobin for the purpose of optimally estimating electrical data.

(10)   Response to Arguments

Issue #1 (Starts on Page 10)

With respect to the 35 USC 102 rejections, Appellant argues regarding claims 1, 6, 11,

and 16 that Tobin does not disclose or even mention, "applying a clustering method...to

create a clustered first data." Appellant further argues that Tobin does not disclose

correlating the clustered first data (Page 10, Paragraph 2, Page 11, Paragraph 2).

Examiner's position is that Tobin does disclose, "applying a clustering method...to

create a clustered first data" in Column 2, Lines 40-48. Tobin mentions, " categorizing

the data into a plurality of categories..." In addition, Figure 2 shows " clustering analysis

for SPC" further described in Column 4, Lines 20-50. Tobin also describes the original

density image $\rho(x,y)$, is initially parsed into two categories based on defect density

values: low density and high density, potentially clustered events.

Appellant argues that Tobin does not disclose correlating the clustered first data (Page

10, Paragraph 2, Page 11, Paragraphs 1 and 3, Page 12, Paragraph 1).

Examiner's position is that Tobin does disclose correlating the clustered first data. First

clustered data is referred to being the <u>categorized</u> signature event (Column 2, Lines 40-

48). Furthermore according to the Abstract Tobin discloses, "classifying the categorized

data contained in each high level category into user label signature events, and

<u>correlating</u> the categorized ..."

Appellant argues Tobin does not disclose a mathematical process for categorizing

(Page 12, Paragraph 2).

Examiner's position is that Tobin does disclose a mathematical process for categorizing.

The use of the statistical process control or SPC clustering can be considered a

mathematical process. Tobin refers to the use of SPC clustering in Column 5, Lines 13-

55.

Appellant further argues that Tobin does not teach a method wherein clustering method

is spatial signature analysis as claimed in claims 2, 7, 12, 17 (Page 13, Paragraph 3 –

Page 15, Paragraph 1).

Examiner's position is that Tobin does disclose the clustering method (Column 2, Lines

40-48) while evaluating wafer map data and uses spatial signature analysis (Column 2,

Lines 23-25).

Appellant argues that dependent claims 5, 10, 15, and 20 are allowable because they

depend on independent claims 1, 6, 11, and 16. Appellant further argues that Tobin

does not disclose or even mention analyzed data from a group consisting of wafer

mapping, commonality, or correlation (Page 15, Paragraph 3).

Examiner's position is that Tobin discloses analyzed data from a group consisting of

wafer mapping, commonality, or correlation (Column 3, Lines 50-58).

Issue #2

With respect to 35 USC 103 rejections Tobin in view of Leung. With regards to claims 3,

8, 13, 18, appellant argues that the invention is unrelated to the automated defect

spatial signature analysis of semiconductor wafers but instead is related to retail sales

systems (Page 16, Paragraph 2 – Page 19, Paragraph 1).

Examiner's position is that the motivation to combine the two references of Leung as

taught into Tobin teaches K-means clustering. The method of K-means clustering as

taught by Leung into Tobin is used to further optimize partitions within a data set as

taught by Leung (Leung, Background of Invention, Lines 58-67). Although the Leung

reference is related to retail sales systems, the use of K-means clustering is used to

examine the data. Appellant discloses this use of K-means clustering in the application

on Page 6, Line 29 – Page 7, Line 4.

Issue #3

With regards to claims 4, 9, 14, and 19, appellant argues that the combination of Tobin

and Arai taken as a whole would be combining a wafer analysis system with a battery

charging system and that there is no support to combine the Tobin and Arai references

(Page 19, Paragraph 2 – Page 22, Paragraph 1).

Examiner's position is that both references are directed towards data manipulation in

electrical based systems. Therefore the limitations in the claims suggest that the first

data computes a voltage-current characteristic as shown in both references (Arai,

Abstract). In addition Arai teaches the use of data manipulation starting at Column 2,

Line 52 – Column 3, Line 30).

Issue #4

Appellant argues whether the Examiner is allowed to give the broadest possible

interpretation to a claim to read on an element that is not present in the prior art (Page

22, Paragraph 2 – Page 23, Paragraph 1).

Examiner's position is that the prior art discloses all the limitations presented under 35

USC 102(e) rejection thus examiner is allowed to give the broadest possible

interpretation to a claim.

(11) Conclusion

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Sujoy Kundu

April 4, 2006

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